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GB1773B

22SEP02 E749990-2 D01025

P01/7700 0.00-0221934.3

2. Patent application number
(The Patent Office will fill in this part)

0221934.3

20 SEP 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*
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C 846923/001
Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

A TELECOMMUNICATIONS SECURITY UNIT

5. Name of your agent *(if you have one)*
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Country	Priority application number <i>(if you know it)</i>	Date of filing <i>(day / month / year)</i>
GB	0212833.8	01.06.02

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DUPPLICATE

- 1 -

A TELECOMMUNICATIONS SECURITY UNIT

Field of the invention

The present invention relates to a telecommunications security unit, in particular to such a unit which enables an authorised person to control the use of telecommunication equipment by others, such as to barr the use of a telephone from making outgoing calls to unauthorised numbers and as an Internet connection limiting device.

10

Background of the invention

Systems are known for controlling the use of telephone equipment by barring outgoing calls to certain prescribed numbers, such as international numbers, premium rate numbers or numbers outside the local area. While such systems have their uses, it is necessary for the person programming such a system to anticipate all the numbers which he considers to be unauthorised. For an employer who does not have minute by minute sight of his staff, there may be a need to prevent employees from making personal calls without authority.

15

20

We are aware of United States patent US 5802157 (Clarke et al.) which describes a service for screening outgoing telephone calls. The service allows a subscriber to determine the times of day and/or days of the week when she wants her outgoing calls on her telephone line to be restricted to numbers which have been approved by her. Calls to numbers other than those on the authorised list will not be completed.

25

30

35

We are also aware of International patent application WO87/00376 (Newell) which describes a telephone line access control for preventing unauthorised outgoing calls on a telephone line. Dialling signals on the line are monitored, the monitored signals are encoded, and the encoded signals are compared with a memorised authorisation code. Control

circuitry temporarily interrupts the line connection when the encoded signals do not match the authorisation code.

SUMMARY OF THE INVENTION

5 According to the invention there is provided a telecommunications security unit comprising:

(i) a first connector for connection to a telecommunications device,

10 (ii) a second connector for connection to a telecommunications line,

(iii) a switch having a closed position in which a signal pathway within the unit between the first connector and the second connector is enabled and an open position in which the signal pathway is interrupted,

15 (iv) a control device for controlling the position of the switch,

(v) a programmable memory for storing allowed signal sequences and at least one authorised pass number,

(vi) a comparator in operative connection with the control device for comparing signals on the pathway with the allowed stored signal sequences, the control device being adapted to open the switch when a signal on the pathway does not match one of the stored signal sequences, and

20 (vii) a programmer adapted to receive pass numbers and programming signals, the programmer including an authorised pass number recognition device for comparing a received pass number with the authorised pass numbers stored in the memory, and being adapted to program the memory only when an authorised pass number is received.

25

30 The telecommunications device which is connected to the unit may be a telephone handset, or the modem of a computer.

35 The unit may further comprise an indicator lights (e.g. green and red respectively) adapted to operate when a telecommunications device connected to the first connector.

is operative and when the switch is opened. The unit may also include an audible warning device adapted to operate when the switch is opened.

5 The unit may include a battery for powering the unit. The control device may be adapted to open the switch when no operative telecommunications device is connected to the first connector, thereby to save battery power.

10 The unit may further include a clock, in operative connection with the control device, for determining the date, the time of day and elapsed time. The memory may be arranged to store allowed time data and the control device may then be adapted to open the switch in response thereto, e.g at certain times of day or after certain cumulative time 15 periods.

In a first embodiment of the invention the memory is adapted 20 to store dialling codes, and the control device is adapted to open the switch when a dialling code applied to the pathway does not match one of the stored dialling codes.

25 In a second embodiment of the invention the control device may be adapted to open the switch when the modem of a computer to which it is connected is connected to an Internet service provider and signal sequences on the pathway do not match one of the stored signal sequences.

30 The unit may therefore be used for limiting connection to the Internet to preset times of day, and to preset cumulative time limits. Both preset limits can be configured by an authorised end user. To this end, the unit determines active connection to an Internet service, by comparing signals on the pathway when a connection to an Internet 35 service provider is established, with signal sequences stored in the memory of the unit. The unit provides a

protected method for setting time limits and a method for disconnection of service during restricted times.

5 In a preferred embodiment, the unit according to the invention is stored in a lockable housing. The lock of the housing is preferably key operated, and the control device is preferably adapted to open the switch when the lockable housing is unlocked.

10 The second connector of the unit is ideally in the form of a plug, adapted to co-operate with a wall socket connected to the telecommunications line.

15 The unit may further comprise a third connector for connecting the unit to a telephone handset, the third connector being connected within the unit to the programmer, whereby the memory can be programmed by use of the handset, e.g. by the use of dtmf tones. Alternatively or 20 additionally, the programmer is connected within the unit to the signal pathway, whereby the memory can be programmed by programming signals applied to the signal pathway.

25 The unit according to the invention may be modified as necessary to meet local telecommunications apparatus regulations.

The invention will now be further described, purely by way of example, with reference to the accompanying drawings, in which:

30 Figure 1 is a diagrammatic illustration of a first embodiment of the invention for barring calls to preselected numbers;

35 Figure 2 is a circuit diagram of the call barring unit shown in Figure 1; and

Figure 3 is a diagrammatic illustration of a first embodiment of the invention for limiting access to the Internet.

5 Figure 1 shows a unit 10 having a first connector 12 connected to a telephone handset 14. A second connector 16, in the form of a plug, co-operate with a wall socket 44 to connect the unit to a telecommunications line 18.

10 A switch 20 within the unit 10 has closed and open positions. In the closed position a signal pathway 22 within the unit 10 between the first connector 12 and the second connector 16 is completed. In the open position the signal pathway 22 is interrupted. The switch 20 is controlled by a control device 24, which is adapted to open the switch 20 when a dialling code applied to the pathway 22 does not match one of the dialling codes stored in a programmable memory 26. The memory 26 may store, for example, ten or twenty authorised dialling codes. The memory 26 also stores at least one authorised pass number.

15

20 A comparator 30 is in operative connection with the control device 24 and compares dialling codes applied to pathway 22 from the handset 14 with the allowed stored dialling codes in the memory 26. The control device 24 opens the switch 20 when a dialling code on the pathway 22 does not match one of the stored dialling codes.

25

30 A programmer 32, adapted to receive pass numbers and programming signals, is connected within the unit 10 to the signal pathway 22. The programmer 32 includes an authorised pass number recognition device 34 for comparing a received pass number with the authorised pass numbers stored in the memory 26, and allows programming of the memory 26 only when an authorised pass number is received. In this manner, the memory 26 can be programmed by programming signals applied

35

to the signal pathway 22 .

A green indicator light 36 operates when the handset 14 connected to the first connector 12 is taken off-hook.

5

A red indicator light 38 is lit when the switch 20 is opened, to indicate that the connection has been broken.

10 An audible warning device 40 also operates when the switch 20 is opened.

15 A battery 42 is provided for powering the unit 10 and the control device 24 is adapted to open the switch 20 when the handset 14 is on-hook, thereby to save battery power.

15

The unit 10 is stored in a lockable housing 46, the lock 48 of the housing 46 being key operated. The control device 24 opens the switch 20 when the lockable housing 46 is unlocked.

20

25 The unit operates as follows. When the receiver of the handset 14 is lifted, the green light 36 is illuminated showing an off-hook condition. The user then dials the desired number in the usual way. If the number which is dialled does not match a number stored in the memory 26, the unit opens the switch 20 to disconnect the line.

25

30 Disconnection is also signalled by a tone from the audible warning device 40 and by illumination of the red light 38 on the unit. The unit is automatically switched off when phone is on-hook, to save battery power.

30

35 The unit can be reprogrammed as follows. Firstly, a non-number code such as **** is dialled on the handset 14 to trigger the programming mode. To indicate this to the user, the control device 24 applies 2 beeps to the pathway 22 which will be heard by the user on the handset 14. The user

now enters a pass number e.g. 1234. The recognition device 34 compares this applied pass number with the one or more pass numbers stored in the memory 26. If the pass number matches, programming may continue. To indicate this to the user, the control device 24 again applies 2 beeps to the pathway 22 which will be heard by the user on the handset 14. If the pass number is not recognised the unit is shut down. The user may now enter a new authorised number into the memory 26, indicating its position in that memory, and thereby overriding any number previously stored in that position. For example the user may enter 01322 664601#3 and the unit will store the number 01322 664601 in location 3. The unit then shuts down. This programming process can be repeated until all locations of the memory 26 are used.

In addition to the programmable locations of the memory 26, one or more memory locations may be reserved for emergency numbers according to local practice, such as 999 and 911 and these numbers cannot be over-ridden.

The unit may be adapted in such a manner as to allow the user to change the pass number. Also, the unit may be adapted to over-ride the need for a pass number, if for example, the pass number should be forgotten. Thus, for example, if pass number forgotten the user presses an internal reset button, lifts the receiver on the handset and keeps holding button for 1 second. When the user next goes into programming mode, any pass number may be entered and this will become a new stored pass number.

The unit 10 can also be programmed remotely by ringing the phone it is connected to, having someone answer and then keying in from your remote phone as you would for the local phone.

The components used in the circuit shown in Figure 2 are as

detailed in the following table.

TABLE 1

	Type	Qty.	Reference(s)	Value	Specification
Resistors					
5		2	R1, R2	330R	1206
		5	R3, R7, R14, R18, R19	10K	1206
		5	R4, R6, R10, R11, R13	1M	1206
10		2	R5, R12	100K	1206
		4	R8, R16, R17, R20	1K	1206
		1	R15	390K	1206
Capacitors					
15		1	C1	10 μ	TANT-A 6v
		1	C2	22pf	1206
		2	C3, C8	33pf	1206
		1	C4	1 μ	TANT-A 6v
		3	C6, C9, C10	0.1 μ	1206
		1	C7	0.68 μ	160vac
20	Integrated Circuits				
		1	IC1	AT89C2051	SOIC20
		1	IC2	MT8870DS	SOIC18
		1	IC3	AT24C04	
		1	IC4	4N25S	
25		1	IC5	MAX1615	
		1	IC6	zm33064	
Transistors					
		4	Q1, Q2, Q3, Q4	BC850B	SOT23
Diodes					
30		1	D1	TRILED	COMMON ANODE
		4	D2, D3, D4, D6	BZX85C5V1	
		1	D5	Gf1	SIGNAL DIODE
		2	D7, D8	1N4148	

TABLE 1 (continued)

Type	Qty.	Reference(s)	Value	Specification
Miscellaneous				
5	1	9V	CONN-H2	.1*2 HEADER
	1	BR1	MB6S	
	2	CD1, CD2	0.1μ	1206
	1	LINE	BT631A	
	1	PHONE	BT605A	
10	1	PZ1	piezo	
	1	RL1	RELAY	4.5V HIGH SENS
	1	RST	SW-SPST	
	1	S1	SWITCH	MICROSWITCH
	1	T1	P3191	P2781 SMD
15	1	X1	CRYSTAL	3.579545MHZ

In Figure 2, the switch 20 of Figure 1 is embodied as the relay RL1, the first connector 12 of Figure 1 is embodied as the PHONE connector, the memory 26 of Figure 1 is embodied as the integrated circuit IC3, the second connector 16 of Figure 1 is embodied as the LINE connector, the control device 24, the comparator 30 and the programmer 32 of Figure 1 are together embodied as integrated circuit IC1, the recognition device 34 of Figure 1 is embodied as integrated circuit IC2, the green indicator light 36 and the red indicator light 38 of Figure 1 are embodied as diode D1, and the audible warning device 40 of Figure 1 is embodied as piezo device PZ1.

The embodiment of Figure 3 is an in-line, securely fixed, line connection unit having a construction similar to the unit shown in Figure 1 except as follows.

The telecommunications device is the modem 15 of a computer.

The control device 25 is adapted to open the switch 21 when the modem is connected to an Internet service provider and

signal sequences on the pathway 23 do not match one of the stored signal sequences. Thus the unit acts as a signal detector for valid modem signals.

5 In this embodiment a clock 28 is provided in operative connection with the control device 25, for determining the date, the time of day and elapsed time.

10 The memory 27 stores allowed time data and the control device 25 opens the switch 21 in response thereto at certain times of day or after certain cumulative time periods.

15 In this embodiment a third connector 49 is provided for connecting the unit 10 to a telephone handset 50, the third connector 49 being connected within the unit 10 to the programmer 32, so that the memory 27 can be programmed by dtmf tones generated from the handset 50. The telephone handset 50 thus acts as a configuration input device for the unit. All configuration data is entered as dtmf tones from 20 the telephone handset 50. Access to the configurations will be via a pass number, as described in connection with Figure 1. In this way, the internal clock, the elapsed time, the allowable time-of-day, and the time per week may be set / reset.

25 As with the embodiment shown in Figure 1, the unit will plug into the telephone wall socket, and be locked in place. When the key switch 48 on the unit is opened, this defeats 30 all the unit's features, allowing only the clock 28 to continue running.

CLAIMS

1. A telecommunications security unit comprising:

5 (i) a first connector (12) for connection to a telecommunications device (14, 15),

(ii) a second connector (16) connected to a telecommunications line (18),

10 (iii) a switch (20, 21) having a closed position in which a signal pathway (22, 23) within the unit between the first connector (12) and the second connector (16) is enabled and an open position in which the signal pathway (22, 23) is interrupted,

15 (iv) a control device (24, 25) for controlling the position of the switch (20, 21),

20 (v) a programmable memory (26, 27) for storing allowed signal sequences and at least one authorised pass number,

25 (vi) a comparator (30) in operative connection with the control device (24, 25) for comparing signals on the pathway (22, 23) with the allowed stored signal sequences, the control device (24, 25) being adapted to open the switch (20, 21) when a signal on the pathway (22, 23) does not match one of the stored signal sequences, and

30 (vii) a programmer (32) adapted to receive pass numbers and programming signals, the programmer (32) including an authorised pass number recognition device (34) for comparing a received pass number with the authorised pass numbers stored in the memory (26, 27), and being adapted to program the memory (26, 27) only when an authorised pass number is received.

2. A telecommunications security unit according to claim 1, further comprising an indicator light (36) adapted to operate when a telecommunications device (14, 15) connected to the first connector (12) is operative.

5

3. A telecommunications security unit according to claim 1 or 2, further comprising an indicator light (38) adapted to operate when the switch (20, 21) is opened.

10

4. A telecommunications security unit according to any preceding claim, further comprising an audible warning device (40) adapted to operate when the switch (20, 21) is opened.

15

5. A telecommunications security unit according to any preceding claim, further comprising a battery (42) for powering the unit.

20

6. A telecommunications security unit according to claim 5, wherein the control device (24, 25) is adapted to open the switch (20, 21) when no operative telecommunications device (14, 15) is connected to the first connector (12), thereby to save battery power.

25

7. A telecommunications security unit according to any preceding claim, stored in a lockable housing (46).

30

8. A telecommunications security unit according to claim 7, wherein the lock (48) of the housing (46) is key operated.

35

9. A telecommunications security unit according to claim 7 or 8, wherein the control device (24, 25) is adapted to open the switch (20, 21) when the lockable housing (46) is unlocked.

10. A telecommunications security unit according to any preceding claim, wherein the second connector (16) is in the form of a plug, adapted to co-operate with a wall socket (44) connected to the telecommunications line (18).

5

11. A telecommunications security unit according to any preceding claim, in which the memory (26) is adapted to store dialling codes, and the control device (24) is adapted to open the switch (20) when a dialling code applied to the pathway (22) does not match one of the stored dialling codes.

10

12. A telecommunications security unit according to any preceding claim, wherein the telecommunications device (14) is a telephone handset.

15

13. A telecommunications security unit according to any preceding claim, wherein the telecommunications device (15) is the modem of a computer.

20

14. A telecommunications security unit according to claim 13, wherein the control device (25) is adapted to open the switch (21) when the modem is connected to an Internet service provider and signal sequences on the pathway (23) do not match one of the stored signal sequences.

25

30

15. A telecommunications security unit according to any preceding claim, further comprising a clock (28), in operative connection with the control device (25), for determining the date, the time of day and elapsed time.

35

16. A telecommunications security unit according to claim 15, wherein the memory (27) further stores allowed time data and the control device (25) is adapted to open the switch (21) in response thereto.

17. A telecommunications security unit according to any preceding claim, further comprising a third connector (49) for connecting the unit to a telephone handset (50), the third connector (49) being connected within the unit to the programmer (32), whereby the memory (26) can be programmed by use of the handset (50).

5

18. A telecommunications security unit according to any preceding claim, wherein the programmer (32) is connected within the unit to the signal pathway (22), whereby the memory (26) can be programmed by programming signals applied to the signal pathway (22).

10

15

19. A telecommunications security unit, substantially as hereinbefore described, with reference to the accompanying drawings.

ABSTRACTA TELECOMMUNICATIONS SECURITY UNIT

5 The unit comprises (i) a first connector (12) for connection to a telecommunications device (14, 15), (ii) a second connector (16) connected to a telecommunications line (18), and (iii) a switch (20, 21) having a closed position in which a signal pathway (22, 23) within the unit between the first connector (12) and the second connector (16) is
10 enabled and an open position in which the signal pathway (22, 23) is interrupted. A control device (24, 25) for controls the position of the switch (20, 21). A
15 programmable memory (26, 27) stores allowed signal sequences and at least one authorised pass number. A comparator (30) is in operative connection with the control device (24, 25) and compares signals on the pathway (22, 23) with the allowed stored signal sequences. The control device (24, 25) opens the switch (20, 21) when a signal on the pathway (22, 23) does not match one of the stored signal sequences.
20 A programmer (32) receives pass numbers and programming signals, the programmer (32) includes an authorised pass number recognition device (34) for comparing a received pass number with the authorised pass numbers stored in the memory (26, 27). The memory (26, 27) can be reprogrammed only when
25 an authorised pass number is received.

(Figure 1)

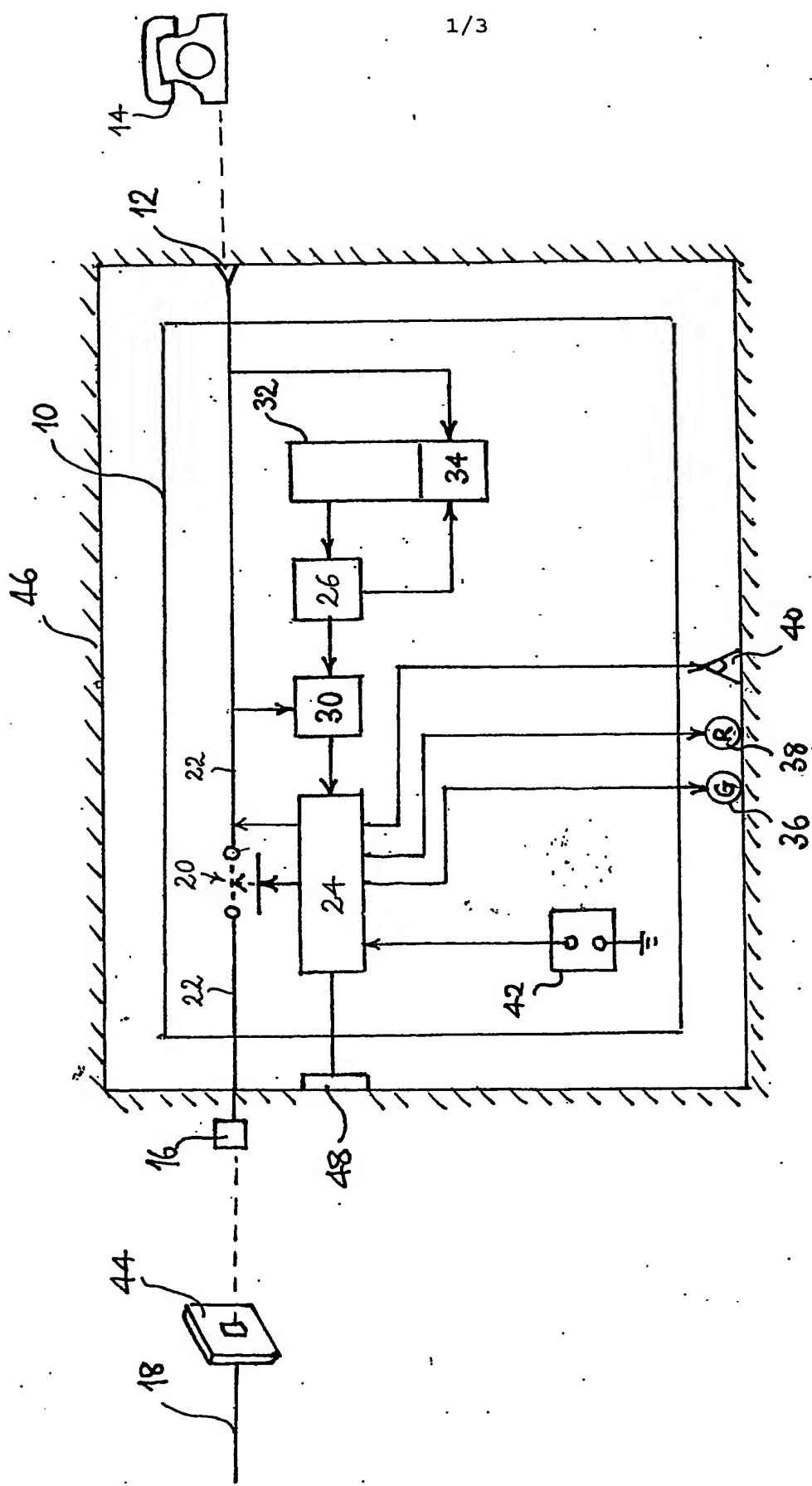


Figure 1

ISOLATION BARRIER

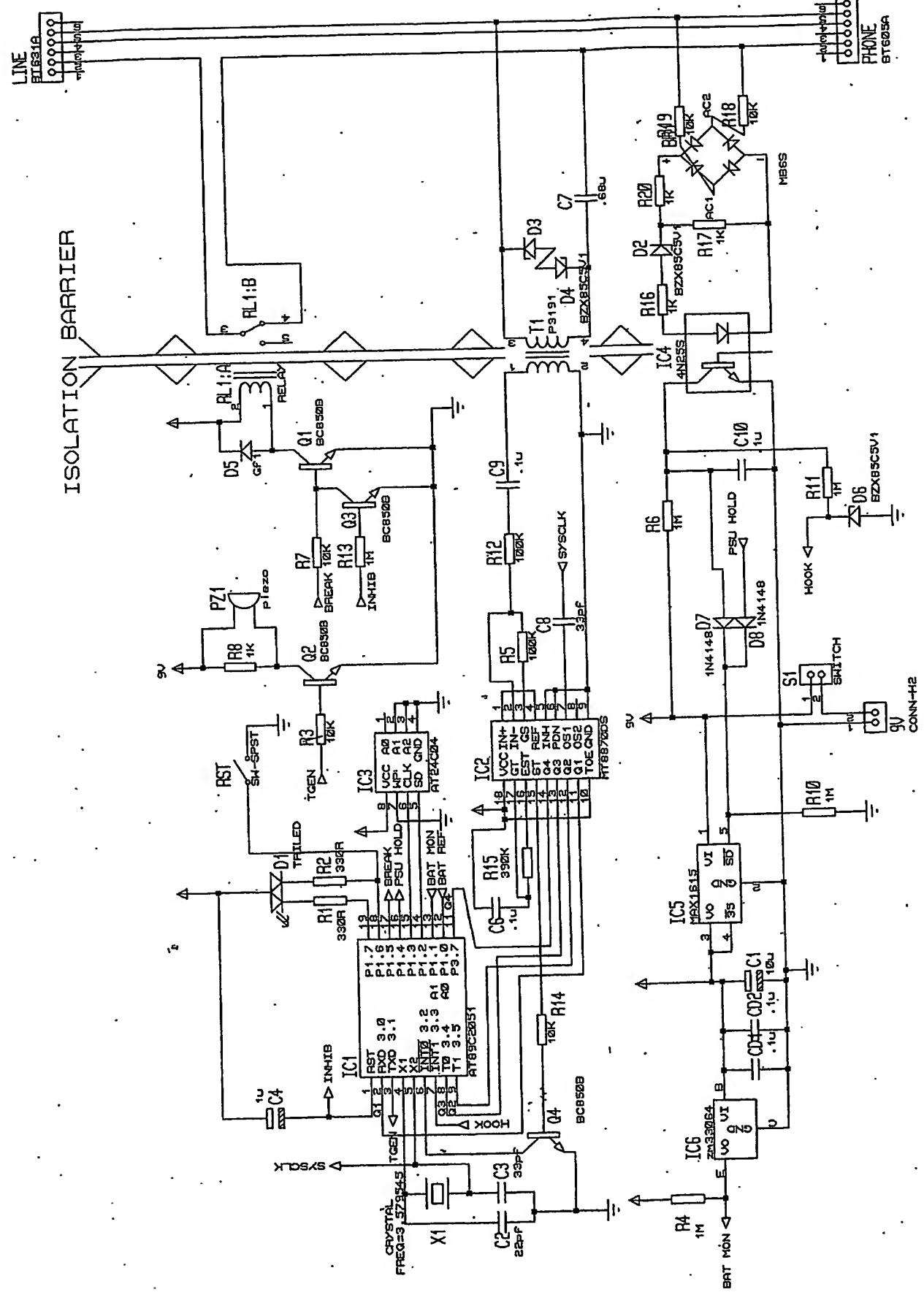
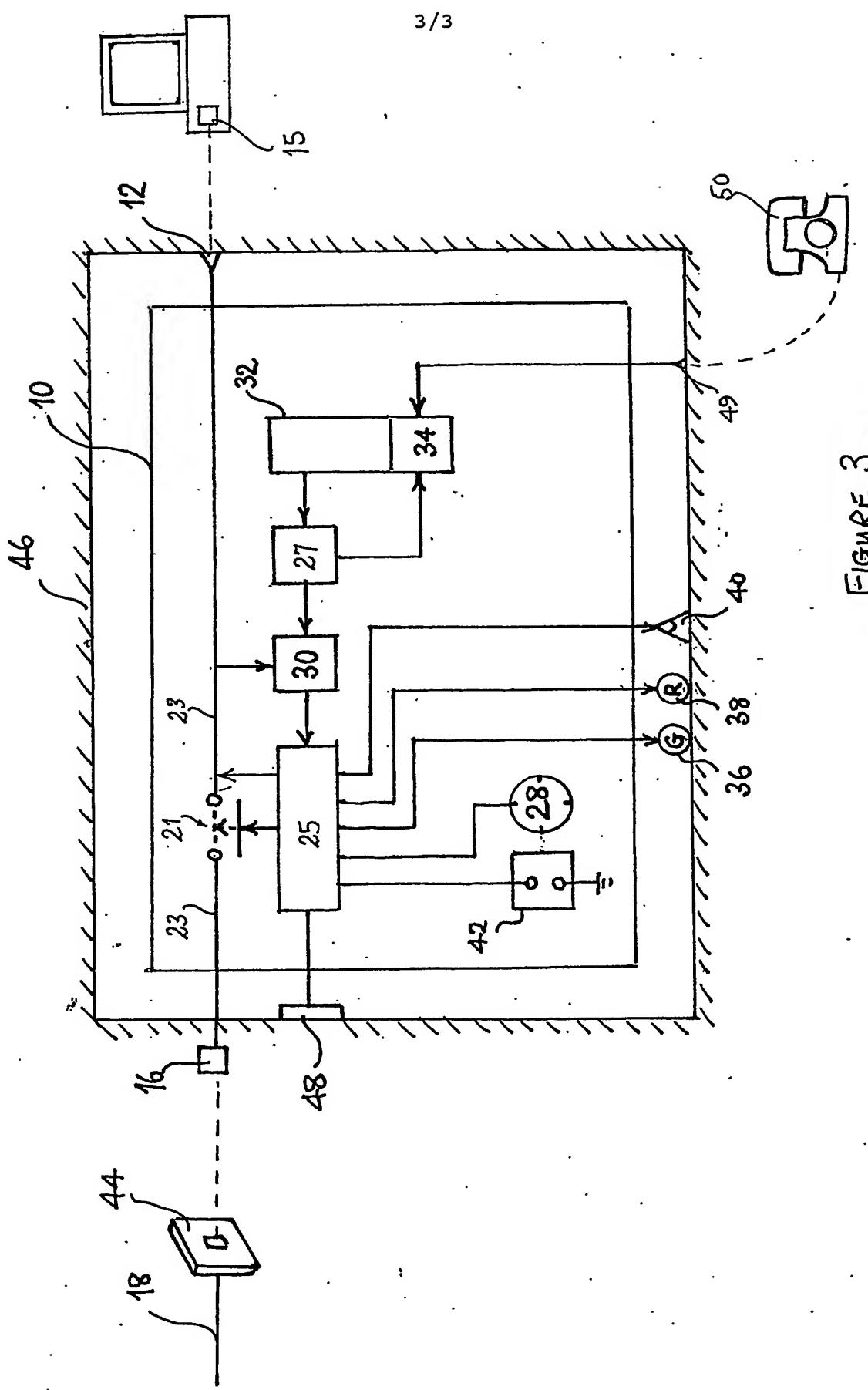


FIGURE 2

Figure 3

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